Upper Mississippi River Nine-Foot Channel Project,
Lock and Dam Number 7
Dresbach, Minnesota, vicinity
Winona County, Minnesota
La Cross County, Wisconsin

HAER No. MN-24

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Rocky Mountain Regional Office
P. O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

Upper Mississippi River Nine-Foot Channel Project, Lock and Dam Number 7

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Location: 4.5 miles upstream from LaCrosse, Wisconsin, and approximately 150.7 miles from Minneapolis, Minnesota. Dresbach vicinity, Wisconsin, Winona County, Minnesota, LaCrosse County, Wisconsin

Normal river width at the time of construction was approximately 1,000 feet. The terrain consisted of bottomlands interrupted by sections of high land. A configuration 8,000 feet east of the east bank, locally known as French Island, separates the Black River from the rest of the Mississippi Valley.

Dates of Construction: 1933-1940

Builder: U. S. Army Corps of Engineers

Present Owner: United States Government
U. S. Army Corps of Engineers, St. Paul District

Present Use: River navigation/hydrology control

Significance: The Upper Mississippi Lock and Dam Project represents one of the largest and most ambitious of such undertakings. With roots in the Progressive Era, the project was adopted by New Deal proponents to serve the needs of public employment during the Great Depression. Its successful completion turned the upper reaches of the world's largest rivers, the Mississippi River, into a intra-continental canal and settled the question of a fully navigable interior river system through the Midwest. Completion of the system helped allay economic inequities in commercial rail and water freight rates brought about as a result of the opening of the Panama Canal.

Although significantly altering the environment of the upper Mississippi, the project also served as an impetus for the upgrading of municipal drinking water and sewage disposal systems, as well as providing new recreational opportunities, thus, in the end, proving generally beneficial to public welfare.

Historian: William Patrick O'Brien
October 1987

NOTE: See Upper Mississippi River Nine-Foot Channel Project History, MN-20, for complete history, footnotes and bibliography.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Dates of Erection: 1933-1940

2. Architect/Engineer: U. S. Army Corps of Engineers

3. Original and Subsequent Owners: United States Government

4. Builders, Contractors, Suppliers:

a. General contractors--lock construction:

Nolan Brothers, Minneapolis, Minnesota
Minneapolis Dredging Company, Minneapolis, Minnesota (earth dike)
Dearborn Electrical Construction Company, Chicago, Illinois (power, control, and lighting system)

b. Subcontractors--lock construction:

Oakes Company, St. Paul, Minnesota (pile driving)
Nueman Dredging Company (common excavation)
Sterling Electric Company (conduit installation)
H. E. Pederson Company, Milwaukee, Wisconsin (placing reinforcing steel)
E. Knudson Company, Chicago, Illinois (painting)
Kruckenberg Roofing Company, Minneapolis, Minnesota (roof, central control station)
Conners Heating, Plumbing and Ventilating Company, Minneapolis, Minnesota (heating, central control station)
Drake Marble Company, St. Paul, Minnesota (tile, central control station)

c. General contractors--dam construction:

Warner Construction Company, Chicago, Illinois

d. Subcontractors--dam construction:

Minneapolis Dredging Company, Minneapolis, Minnesota (excavation)
Ferd J. Robers Co., Burlington, Wisconsin (excavation)
Bethelehem Steel Corporation, Chicago, Illinois (structural steel)

Dearborn Electrical Construction Company (location unavailable)
John Ledegar, LaCrosse, Wisconsin
T. C. Esser Company, LaCrosse, Wisconsin

5. Original Plans and Construction: U. S. Army Corps of Engineers

6. Alterations and Additions:

Item	Year
Clean and repaint Roller and Tainter gates	1940
Construct rock and brush mattress as protection against scour under river wall	1941
Clean and repaint Roller and Tainter gates	1941
Repair upper Miter gates of lock--landward leaf	1945
Extend and build up existing stone protection on downstream side of fixed spillway (Onalaska Dam)	1952
Clean and repaint Miter gates and replace wooden seals with new rubber seals	1954
Install cathodic protection systems	1956
Repaint auxiliary lock gates above water surface	1956
Clean and repaint Roller and Tainter gates	1959
Install traveling mooring bits	1961
Stone protection installation	1961
Stone slope protection installation	1963
Observation platform construction	1964
Access road reconstruction	1965
Install bushings, etc., for gate machinery	1966
Central control station reroofing	1967
Install three aeration slots in spillway	1967
Remove onsite buildings, etc.	1975
Repair tow haulage	1979
Scour protection at locks	1980-81
Repaint gates	1980-81
Repair Onalaska Dam spillway	1980-81
Install new crane on dam	1981
Rehabilitate auxiliary Miter gates	1982
Install loading dock behind lower guide wall	1982-83
Scour repair--dam (rock supply)	1982-83
Scour repair--dam	1983-84

B. Historical Context:

Lock and Dam 7 was a group "B" priority project and the fifth completed out of the original eight in the St. Paul District. Construction of the complex, originally scheduled for the vicinity of LaCrosse, Wisconsin, was

changed to the Onalaska, Wisconsin, area due to water level and inundation problems connected with the LaCrosse site.

The design of Lock and Dam 7 was heavily influenced by the Onalaska site and the presence of French Island, which was incorporated into the design as a natural dike, and the Dresbach Slough, which was reopened to provide the upper approach to the lock.

The lock consists of the standard 110- by 600-foot dimension equipped with an 110 by 360 feet auxiliary lock. Related fixed-dam construction includes a 670 feet wide fixed submersible dam adjacent to Onalaska, Wisconsin, and an earth dike, 9,003 feet in length. The submersible element contains sluiceways for overflow.

The movable dam section consists of five 3-foot submersible roller gates, 80 feet wide and 20 feet high. The Roller gates were fabricated in the Leetsdale plant of the Bethlehem Steel Company, Leetsdale, Pennsylvania, with rack and rim gear castings manufactured at the Farrell-Birmingham Foundry in Buffalo, New York. These pieces were then shipped to the Leetsdale plant for assembly. The Roller gates were erected by the steel subcontractor. Nine non-submersible and two submersible Tainter gates, 35 feet wide and 20 feet high, were fabricated by the Bethlehem Steel Company. The submersible Tainter gates are located adjacent to the abutment pier. Metal components for the movable dam were supplied in conjunction with a variety of sub-contractors.

The lock section of the project was completed on April 18, 1935; the dam section was completed on April 15, 1937. Esplanade, garage, and lockkeepers' dwellings were also part of the project scope and were completed as of 1940.

The lock lift is 8 feet. Upper normal pool elevation is 639 feet. Depth on upper Miter sill is 18 feet; lower Miter sill is 12 feet. Foundations for the lock consist of piles in sand and gravel; foundations for the movable dam consist of piles in sand. The complex took six years to complete (1934-1940), at a total estimated cost of $6,776,000. The complex was opened to navigation in 1937.

PART II. TECHNOLOGICAL INFORMATION--LOCK

A. General Statement:

1. Architectural character: standardized Ohio-Mississippi lock design.

2. Condition of fabric: good

B. Description of General Layout and Principal Elements:

1. Overall dimensions: 110 by 600 feet.

2. Foundations: wood and steel sheet pilings in sand and gravel

B. Description of General Layout and Principal Elements:

1. Overall dimensions: 110 by 600 feet.

2. Foundations: wood and steel sheet pilings in sand and gravel

3. Walls: reinforced monolithic concrete

4. Structural system: see above

5. Bulkheads: concrete bulkhead configurations occur at each end of the riverward lockwall

6. Upper and lower guide walls: monolithic reinforced concrete walls extending out from the lock chamber at either end to assist in the guiding of barge traffic into the lock. Upper guide wall extension on the upriver side connects to the protection dike on the Minnesota side of the river.

7. Stage recorder: small concrete housing located at the end of the lock guide wall. Equipment housed for the recording of river stages.

C. Mechanical Equipment:

1. Operating house: controls for lock gates and Tainter valves housed in small buildings on lock wall.

2. Tainter valves: cable-drive lock valve of steel construction with electric-motorized assembly,

3. Gates: two Miter gates balanced on stainless steel pintels operated by gear arm system and electric motor assemblies. Bumper lines on interior of lock also of stainless steel. All other associated metal parts are of steel, stainless steel, or steel/nickel alloy.

4. Lighting: various freestanding single and double head lighting standards.

5. Plumbing: lock is watered by four cable-drive Tainter valves serving a system of cast-in-place tunnels that enable the water level to be controlled on the interior of the lock.

6. Winch: motorized assembly to assist towing of barges through lockage.

D. Other Elements:

1. Auxiliary lock: fixed Miter gate without machinery and with partial walls, located to the riverward side of the lock complex. Equipped with wells for machinery placement. Never completed or put into service.

PART III. TECHNOLOGICAL INFORMATION--MOVABLE DAM

A. General Statement:

1. Architectural character: type 2a Roller gate piers have large beveled corners and are elephantine in nature.

2. Condition of fabric: excellent.

B. Description of Exterior

1. Overall dimensions: 940 feet in length.

2. Foundations: wood and steel sheet pilings in sand.

3. Operating house walls: monolithic reinforced concrete.

4. Structural system: monolithic concrete/structural steel.

5. Bulkheads: concrete bulkheads located at the base of each Roller gate pier.

6. Operating house openings: two doorways and 13 three-pane slit windows for each Roller gate operating house.

a. Doorways and doors: 12

b. Windows: 78

7. Operating house roofs:

a. Shape, covering: flat roof covered in membrane/tar composition.

b. Towers, piers: six Roller gate piers and operating house towers; one access tower.

8. Access bridges:

a. Shape: arched spans in a segmental series.

b b. Materials: structural steel.

C. Description of General Layout and Principal Elements:

1. Access plans: plans of access consists of a simple stairway to the initial pier operating house, each installation being connected by an access bridge/rail track in a linear series.

2. Stairways: reinforced concrete with pipe railing.

3. Flooring: reinforced concrete

4. Wall and ceiling finish: reinforced concrete

5. Hardware: brass

D. Mechanical Equipment:

1. Movable gates--Roller type: five 3-foot submersible Roller gates, 80 by 20 feet, operating on tooth track and independent chain driven hoist machinery.

2. Movable gates--Tainter type: nine non-submersible and two 2-foot submersible Tainter gates having independent chain-driven hoist machinery.

3. Lighting: fixtures as of time of installation, ca. 1935. Rewiring may have taken place over the years. Extent is unknown.

E. Other Elements:

1. Earth dikes: a linear non-submersible dike with riprap revetment topped with road surfacing, interrupted by a 1,000-foot concrete spillway section, incorporates French Island into its configuration. The earth dike is located at the end of the movable dam section and extends east to the west side of French Island. A 670-foot submersible dam of similar construction (Onalaska Dam), equipped with a culvert, spillway section, and earth dike, runs east/northeast from the east side of French Island to the town of Onalaska on the Wisconsin side.

2. Spillways: a 1,000-foot convex spillway section of reinforced concrete, running southwest, interrupts the earth dike to the east of the movable dam section. A culvert-spillway section of reinforced concrete is also located at the east end of the Onalaska Dam.

3. Experimental emergency bulkheads: experimental temporary blocking units of structural steel girder construction placed in gate openings in period of emergency or repair. Drawings exist; however, it is not known if these items were ever actually constructed or placed in service.

4. Bulkhead car/tracks: car designed to store and access bulkheads. Located in storage yard.

5. Flatcar assembly: car for the transport of gate bulkheads and repair materiaLs.

6. Movable crane: vertical lift crane (replaced ca. 1980) used for the moving of parts and equipment. Operates on track system attached to girder spans. Original "C" type unit. Drawings of replacement unit available from St. Paul District Office.

7. Storage yard: area surrounding the last Tainter gate pier on the Wisconsin side. Contains replacement parts for gates, bulkheads on track cars, and related repair items.

8. Boat launch: single-armed launch of metal construction. Installed ca. 1985.

PART IV. TECHNOLOGICAL INFORMATION--ESPLANADE AREA

A. Description of Esplanade--General Layout:

1. Design character: standardized park/service area component. The esplanade area was originally designed to accommodate the central control station, lockkeeper's and assistant lockkeeper's residences, parking, and other service-related functions. Major site alterations have occurred since that time and are noted in the following items.

2. Historic landscape design: based on standardized design.

B. Condition of Site and Structures: Altered

1. Central control station--exterior: standardized construction. Hip roof; concrete stucco finish.

a. First floor contains central control panel and room, bathroom, main office, and basement stairway access.

b. Basement contains storage and equipment rooms. All interior finishes altered from original construction.

2. Lockkeeper's /assistant lockkeeper's residences: standardized Colonial Revival with side porch. The structures have been moved off site to locations in the La Crescent, Minnesota, vicinity.

3. Outbuildings: various sheds and service buildings have been erected from time to time as demands required. None have particular significance or contribute to the site.

PART V. SOURCES OF INFORMATION

A. Original Architectural Drawings: St. Paul District Office, Construction Drawings--9-Foot Channel Project 1927-1984. Passim.

B. Early Views: Construction Photographs: Lock and Dam 7--Photograph Log Books.

C. Interviews: Personnel, Lock and Dam 7

D. Bibliography:

1. Primary and unpublished sources: National Archives, Record Group 77; Construction Histories--Lock and Dam 7

2. Secondary and published sources:

E. Likely Sources Not Yet Investigated: National Archives, Record Group 77, Suitland, Maryland; St. Louis, Missouri.

F. Supplemental Material: Aerial Photographs, U. S. Army Corps of Engineers, St. Paul District.